ELECTRONIC INNOVATIONS IN ACTION

TUBES

20LF6

Pentode

FOR TV HORIZONTAL-DEFLECTION AMPLIFIER APPLICATIONS

The 20LF6 is a beam power pentode designed for use in horizontal deflection circuits of color television receivers.

GENERAL

ELECTRICAL

HEATER CHARACTERISTICS AND RATINGS

Heating	A.C. or D.C. parallel supply	
Heater Voltage	20.0	volts
Heater Current	0.6	amps

Direct Interelectrode Capacitances (unshielded)

Plate to Grid–Number 1 (p to g1)	2.5 pF
Input	37.0 pF
Output	18.5 pF

MECHANICAL

Additional support of the tube at the top is required.

Envelope – T–12, Glass

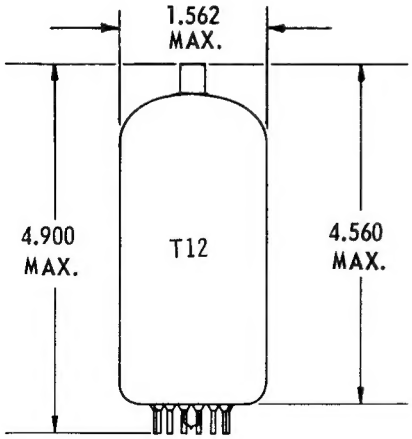
Base – E12–74, Button 12 Pin

Top Cap – C1–1

Outline Drawing

Maximum Diameter	1.562	Inches
Maximum Over–all Length	4.900	Inches
Maximum Seated Height	4.560	Inches

PHYSICAL DIMENSIONS

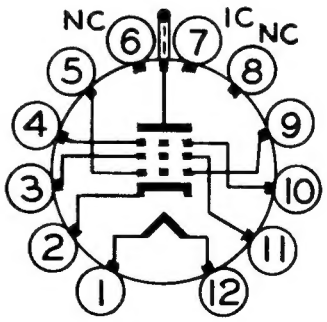


E12–74

TERMINAL CONNECTIONS

Pin 1 – Heater
Pin 2 – Cathode
Pin 3 – Grid–Number 2
Pin 4 – Beam Plates
Pin 5 – Grid–Number 1
Pin 6 – No Connection
Pin 7 – Internal Connection (Do not use)
Pin 8 – No Connection
Pin 9 – Grid–Number 1
Pin 10 – Beam Plates
Pin 11 – Grid–Number 2
Pin 12 – Heater
P – Plate (Top Cap)

BASING DIAGRAM



EIA 12GW

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MAXIMUM RATINGS

HORIZONTAL-DEFLECTION AMPLIFIER SERVICE
DESIGN-MAXIMUM VALUES UNLESS OTHERWISE INDICATED

Plate Voltage at Zero Current	990	volts
Peak Positive Plate Voltage •	8000	volts
Plate Dissipation	40	watts
Temporary Overload Plate Dissipation ♦	200	watts
Beam Plate Voltage	50	volts
Grid No. 2 Voltage at Zero Current	770	volts
Screen Voltage	275	volts
Screen Dissipation ▲	9	watts
Cathode to Heater Voltage		
D.C. ⊣ Peak, k positive	200	volts
k negative ⊕	200	volts
Beam Plates Circuit Resistor †	10000	ohms
Peak Negative Grid No. 1 Voltage ★	550	volts
Bulb Temperature (hotspot)	300	°C
Grid No. 1 Circuit Resistance (Design Center) ‡	0.5	Megohm
Cathode Current (avg) (Design Center)	500	Milliamperes
(peak) (Design Center)	1200	Milliamperes

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

CHARACTERISTICS AND TYPICAL OPERATION

Plate Voltage	160	50	volts
Grid No. 1 Voltage	0	−10	volts
Grid No. 3 Voltage	0	0	volts
Screen Voltage	160	175	volts
Plate Current	1400	800	Milliamperes
Screen Current	45	70	Milliamperes

OPERATING CONDITIONS

Stabilized Circuits (D.C. Feedback)

Cut–Off Voltage

The minimum required cut–off voltage (−Ec1) during flyback at Eb=7000 volts and Zc1=1 kΩ at line frequency is:

Ec2 = 150 V: Ec1 = −175 V
Ec2 = 175 V: Ec1 = −185 V
Ec2 = 200 V: Ec1 = −195 V
Ec2 = 250 V: Ec1 = −215 V

OPERATING CONDITIONS (Cont'd)

Supply Voltage: Refer to Figures 2, 3 and 4

Minimum Required Plate Voltage (Eb min)

Barkenhausen interference and loss of stability can be prevented by ensuring the plate voltage is above the specified minimum Eb, during the scanning period.

If low values of Eb min. are required, the Eb min. 1–line can be shifted over 10 volts to Eb min. 2 provided a D.C. voltage of at least $\pm$ 20 volts is applied to the beam plate (G3). To compensate for the influence of line voltage variations, the specified values of Eb min. have to be increased with 10% of the plate supply voltage.

Minimum Required Values of the Screen Grid Voltage (Ec2 min.)

The graph refers to nominal line voltage. The specified values of peak plate current will be available throughout life of the tube at supply voltages 10% below nominal.

Maximum Permissible Screen Grid Series Resistance Rc2 max. see Figures 2, 3 and 4

Rc2: To optimize the high tension properties of the tube, it is recommended to apply an unbypassed resistor of 100 ohms at the screen grid of the tube

Rc3: Application of an undecoupled srries resistance of 1000 ohms is recommended.

At Zc1 =200 kΩ (f=50 Hz), Vk/h=220 VRMS and without wiring and socket capacitances the equivalent grid hum voltage is less than 5 mV.

NOTES

- • Maximum pulse duration is 22% of a cycle, but maximum 18 microseconds.
- ♦ Total continuous or accumulated time not to exceed 40 seconds.
- ▲ To prevent an excessive value of Pc2 the minimum Rc2 values are given in Figure 1.
- ⊕ D.C. component maximum 100 volts.
- † With Rc3>10 000 ohms, capacitance decoupling of C3 is not required.
- ⋆ Absolute maximum value.
- ‡ The circuit design has to be such that negative control grid currents up to 5 microamperes do not have detri – mental effect upon tube adjustment or circuit performance. Care should be taken, that with 5 micro–amperes grid current the limiting values for Ik, Pp and Pc2 are not ex– ceeded.

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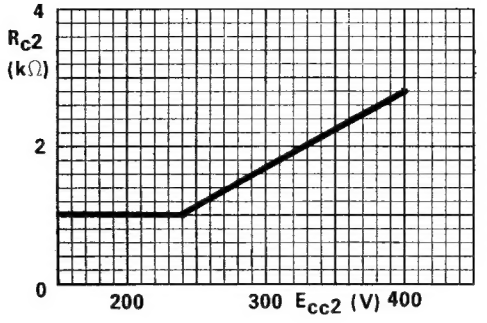


Figure 1

Minimum required plate voltage.
Rc2 maximum: maximum permissible screen grid series resistance for 400 V screen grid supply. The specified values of Ib peak are available at supply voltage 10% below nominal and throughout the tube life.
Note: Rc2 minimum for 400 V screen grid supply is 2.9 kΩ (see Figure 1).

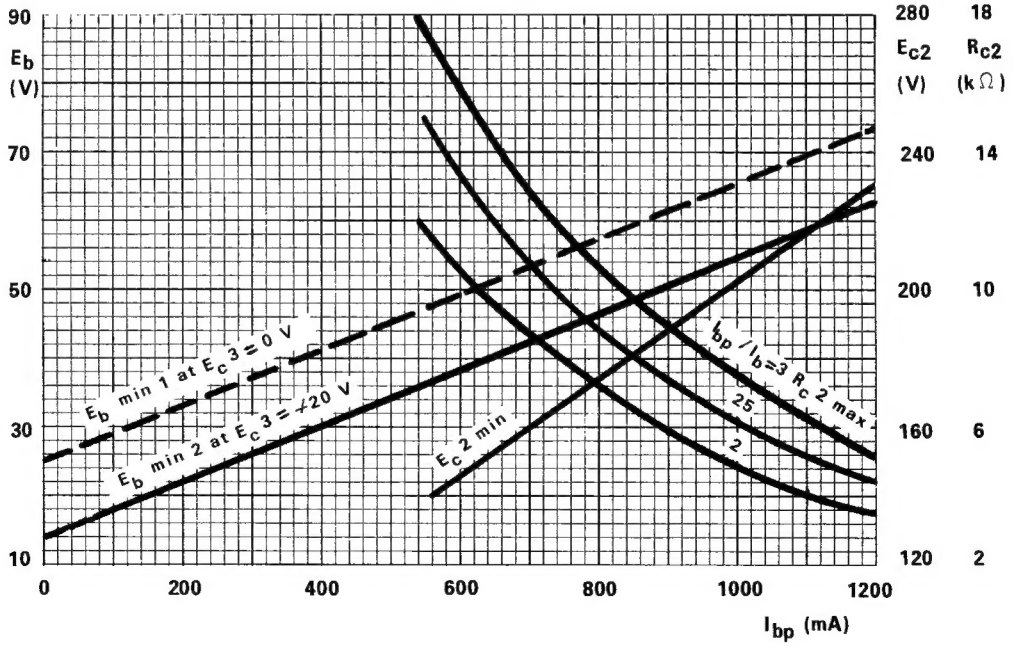


Figure 2

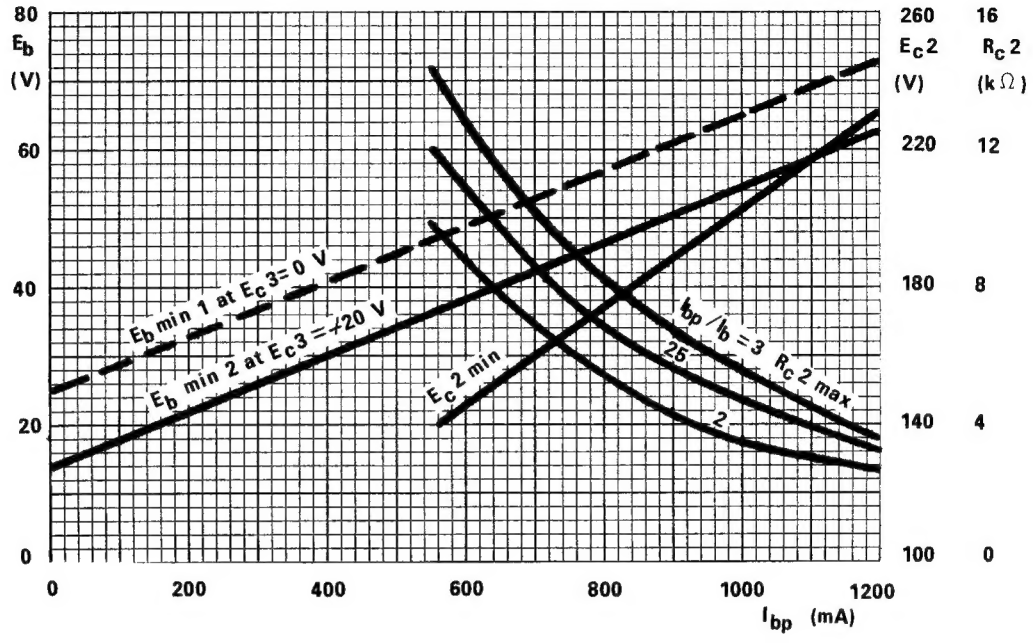
Minimum required plate voltage.

R_c 2 maximum: maximum permissible screen grid series resistance for 350 V screen grid supply.

The specified values of I_b peak are available at supply voltages 10% below nominal and throughout the tube life

Note: R_c 2 minimum for 350 V screen grid supply is 2.2 k Ω (see Figure 1)

Figure 3



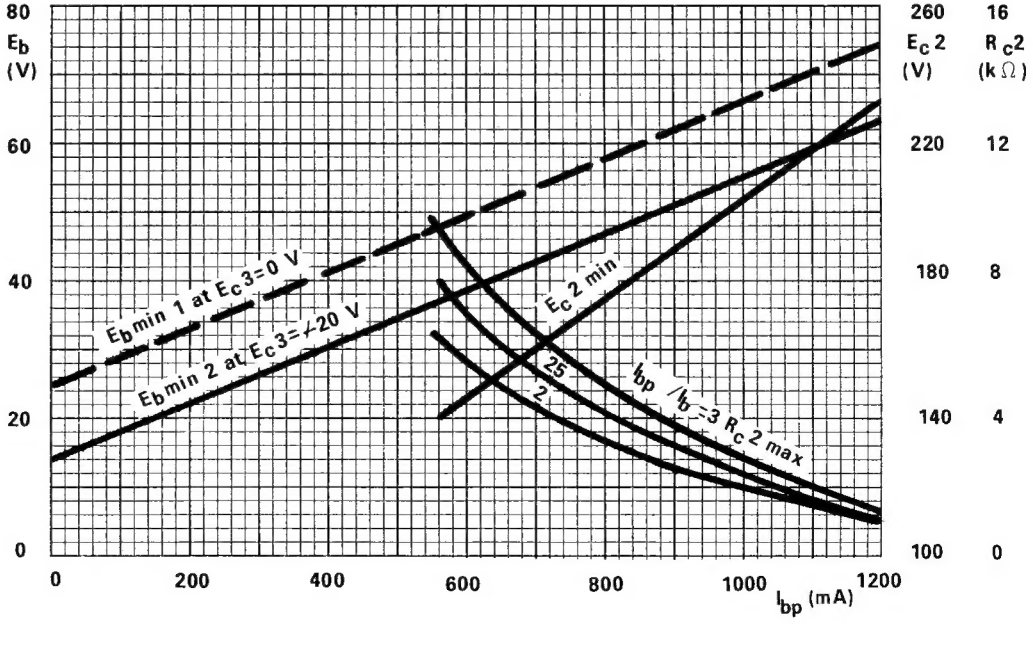
Minimum required plate voltage.

R_c 2 maximum: maximum permissible screen grid series resistance for 280 V screen grid supply.

The specified values of I_b peak are available at supply voltages 10% below nominal and throughout the tube life.

Note: R_c 2 minimum for 280 V screen grid supply is 1.4kΩ(see Figure 1)

Figure 4



TRANSFER CHARACTERISTICS

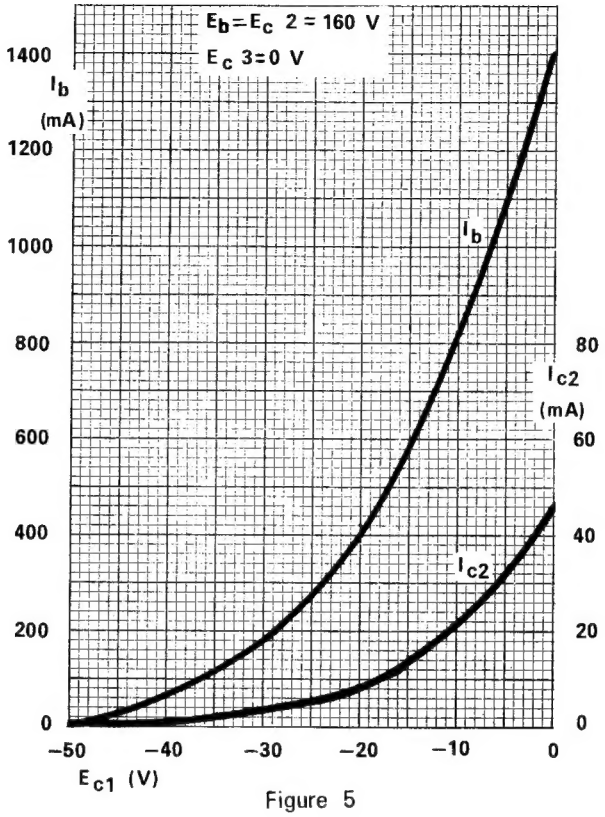


Figure 5

PLATE CHARCATERISTICS

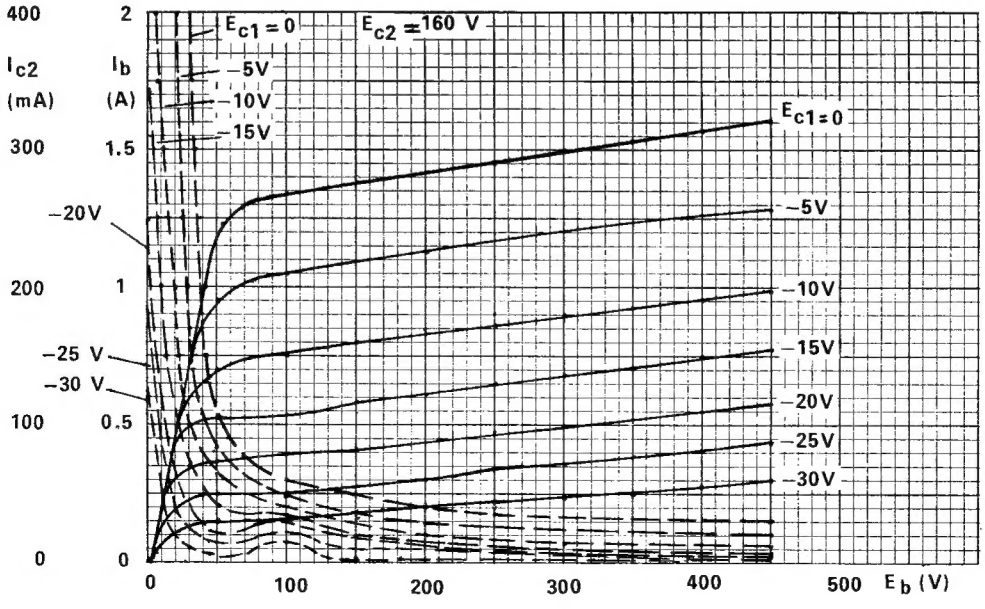


FIGURE 6

PLATE CHARACTERISTICS

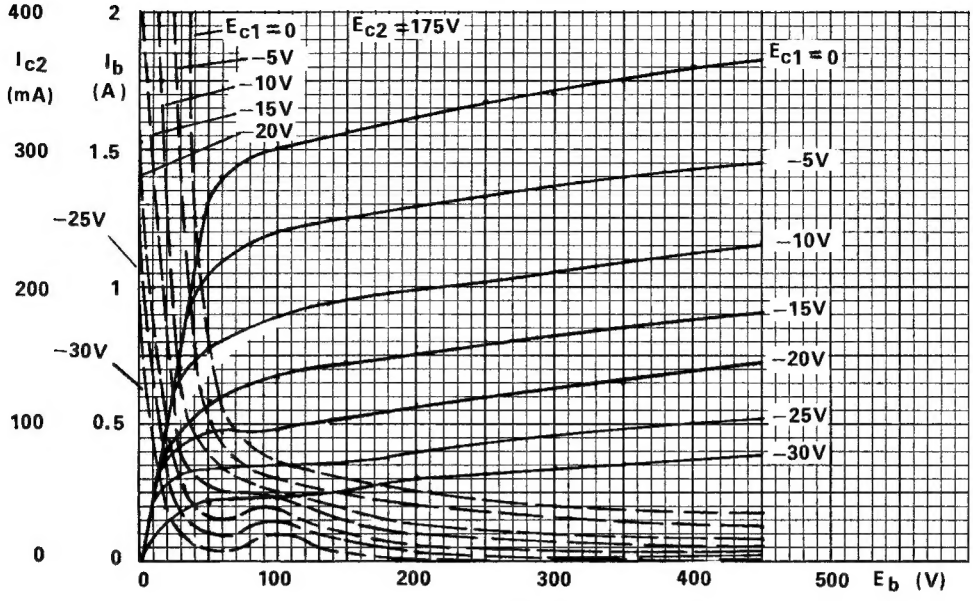


Figure 7

PLATE CHARACTERISTICS

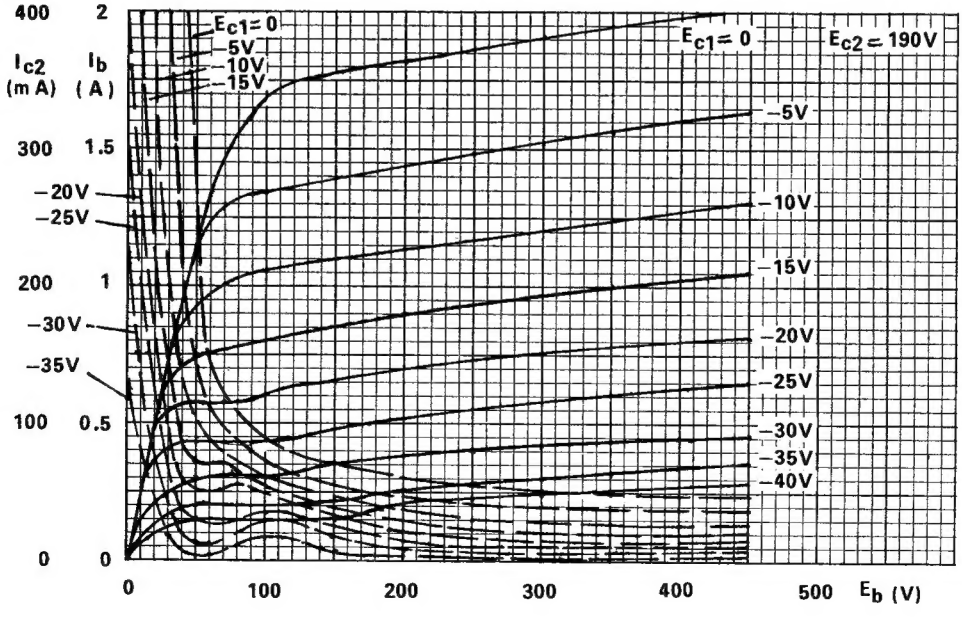


Figure 8